

# TITE LINER® RT SYSTEM

*High-performance thermoplastic liner for elevated temperature and extreme conditions*



## Tite Liner® RT System

United Pipeline System's, Tite Liner® RT system is a raised temperature polyethylene material specifically designed for the severe conditions present in oil & gas and industrial environments. The Tite Liner® RT system utilizes PE-RT resin, a bimodal high-density polyethylene resin technology that enhances its high temperature performance. The Tite Liner® RT system offers a temperature rating of up to 82°C and a non-continuous use temperature up to 95°C.

Tite Liner® RT liners are intended for use in pipeline and piping systems where extreme conditions exist such as high temperatures, pH imbalanced water (saline solutions), aggressive chemicals, hydrocarbons, or highly oxidative conditions. Suitable applications include oil & gas field pipelines, gas distribution pipelines and other industrial/mining applications.

## Highlights of the Tite Liner® RT System

- High temperature resistance – up to 203°F (95°C)
- Eliminates internal corrosion in severe applications
- Chemically compatible in broad oil and gas applications with H<sub>2</sub>S and CO<sub>2</sub>
- Withstands highly oxidative conditions
- Superior notch and scratch resistance
- Superior resistance to rapid crack propagation
- Increased flow capacity with reduced friction loss
- Extended service life resulting in lower cost of ownership versus alternatives such as CRA
- Reliable and safe performance record

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## Performance Highlights

- Suitable for temperature extremes up to 95°C (or 203°F).\*
- Good creep resistance
- Excellent slow crack growth resistance performance
- Excellent rapid crack propagation resistance performance
- Improved cyclic fatigue resistance
- Increased tensile and ductile strength

\*Identifying specific conditions including pH, chemical composition and maximum operating temperature is required.

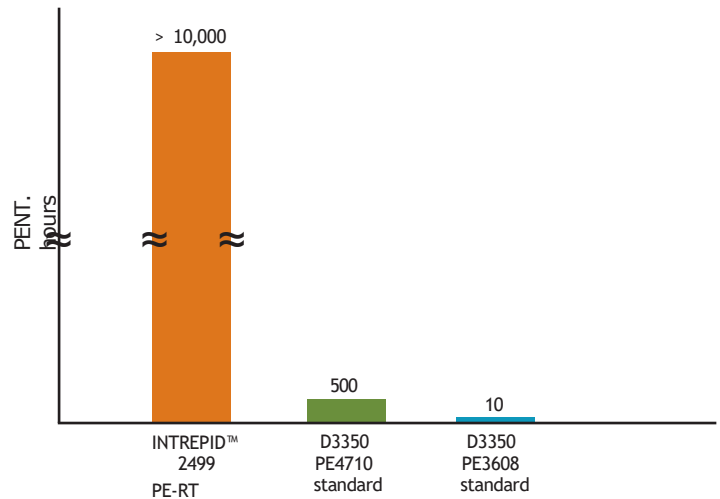
## Raised Temperature Bimodal Polyethylene Resin

In an unrestrained (or free standing) application at a nominal stress of 2.4 MPa (350 psi), PE-RT Bimodal Polyethylene Resins offer more than 10,000 hours in the ASTM F1473 Pennsylvania Notch Test (PENT), compared to the ASTM D3350 requirement of 100 hours for PE3608. Even compared to the ASTM D3350 requirement of 500 hours for PE4710 pipe, the PE-RT resins offer resistance more than 20 times longer.

In a compressed fit lined pipe application, Tite Liner® RT system offers higher temperature creep resistance at the 82°C (180°F) pressure listing for improved integrity.

## Tite Liner® System

United developed the Tite Liner® system in 1985, a technology that enables a thermoplastic liner to fit tightly inside a host pipe. The Tite Liner® system is manufactured with a larger outside diameter (OD) than inside diameter (ID) of the host pipe. The Tite Liner® system temporarily reduces the thermoplastic liner's diameter for insertion. The liner then expands tight following installation and acts as a continuous barrier between the host pipe and the corrosive or abrasive material.



## Physical Properties

Physical	Nominal Value (English)	Nominal Value (SI)	Test Method
Density (natural)	0.950 g/cm <sup>3</sup>	0.950 g/cm <sup>3</sup>	ASTM D792
Melt mass-flow rate			ASTM D1238
190 °C/2.16 kg	0.10 g/10min	0.10 g/10min	
190 °C/21.6 kg	7.0 g/10min	7.0 g/10min	
Mechanical	Nominal Value (English)	Nominal Value (SI)	Test Method
Tensile strength (yield)	> 3500 psi	> 24.1 MPa	ASTM D638 <sup>1</sup>
Tensile elongation (break)	> 500%	> 500%	ASTM D638 <sup>1</sup>
Flexural modulus	152000 psi	1050 MPa	ASTM D790B <sup>2,1</sup>
Resistance to rapid crack propagation, Pc - S-4			ISO 13477 <sup>3</sup>
32 °F (0 °C)	> 174 psi	> 24.1 MPa	
Resistance to rapid crack propagation, Tc - S-4			ISO 13477 <sup>3</sup>
@ 145 psi (10 bar)	< 2 °F	< -17 °C	
Slow crack growth PENT -			
@ 2.4 MPa			
176 °F (80 °C)	> 10000 hr	> 10000 hr	
194 °F (90 °C)	> 10000 hr	> 10000 hr	

### Notes:

1. These are typical properties and are not to be construed as specifications. Users should confirm results by their own tests.
2. This material complies to: ASTM D 3350: cell classification polyethylene PE445584A
3. Plastic Pipe Institute (PPI): TR-4



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